

### ABSTRACT OF THE DISCLOSURE

The invention provides recombinant procollagen chains having a natural collagen chain separated from one or two propeptide by one or two non-natural site-specific proteolytic agent (*e.g.*, protease) recognition sites. A wide variety of propeptides and site-specific proteolytic agent recognition sites may be used: the selection of particular site-specific proteolytic agent/recognition site pairs is based on the conformation of the resulting procollagen, the availability of the site-specific proteolytic agent, the compatibility of the proteolysis with production of mature collagen, among other factors. Recombinant collagens chains are produced by contacting the subject recombinant procollagen chains with the appropriate site-specific proteolytic agents. Nucleic acids encoding the subject procollagen chains operably linked to transcription regulatory elements are used in vectors and cells for the production of recombinant collagen. Such collagen is used in tissue and cell cultureware and therapeutically, such as in biodegradable surgical materials and for tissue augmentation.